



Photos by Edward Coughlin, Springfield Parks Department

A personal digital assistant (PDA) provides a low-cost alternative to more expensive systems for collecting data on public and private trees. Many PDA programs are available for use by arborists and tree managers.

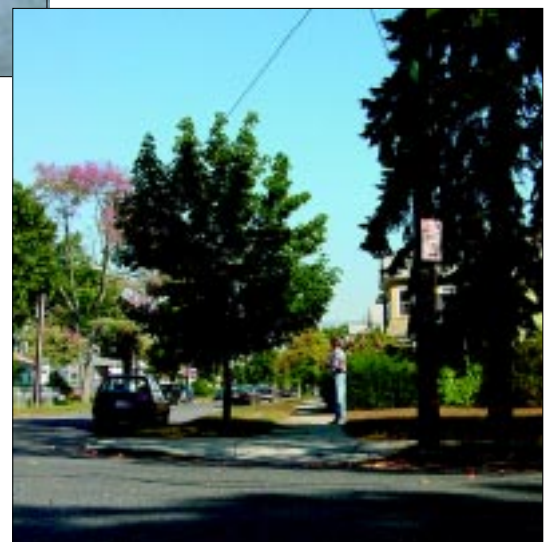
Introduction

Until recently, the collection of tree inventory data has involved the use of expensive hand-held computerized data recorders or simple paper systems to record information on the type, size, condition, health, and maintenance requirements of public and private trees. Whether one was inventorying trees growing along public streets, on private property or in recreation areas such as golf courses, collecting and managing the information required equipping inventory personnel with hand-held data recorders costing thousands, or involved costly data entry once the field work was completed. Today, low-cost solutions to field data collection and storage needs are available, using Personal Digital Assistants, or PDA's, collectively referred to as Palm Pilots. These hand-held devices are inexpensive, easy to use and

Tree Inventories:

In the Palm of Your Hand

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State-of-the-art technology is providing arborists with new, affordable inventory tools, making fieldwork more efficient and less costly. The PDA is one of the more useful advances for completing field surveys.

offer an affordable solution to many users' data collection needs.

Whether you are developing a municipal tree inventory system, tracking the health of park trees, managing trees growing on golf courses, or cataloging trees for homeowner clients, the use of a PDA can increase efficiency, reduce the potential for data input error, and improve the timely reporting of data. Eliminating the need for manual data entry following field collection activities adds to efficiency and reduces the cost of this inventory program. The use of inexpensive PDA's enables one-time entry of data while working in the field, eliminating the need to own or rent costly equipment, or complete timely data-transfer procedures after returning to the office. Typically, a PDA capable of recording tree inventory information can be purchased for about \$150. Inventory software is available for free, or can be obtained from a variety of sources at affordable costs.

Ultimately all of the data collected on a PDA will be downloaded to a database operating on a personal computer. Therefore, the PDA should be viewed as a data-collection tool, from which data will be transferred to a spreadsheet, database or standalone inventory management program. Its usefulness is to streamline field data collection operations, but is not substitute for the use of fully trained, proficient field personnel. However, the use of a PDA complements the use of skilled staff and makes their work in the field more efficient and cost effective.

The computer backbone

The Palm Operating System (OS) is one of the most common computer platforms on which PDA's function. Several manufacturers produce PDA's that use the Palm OS, including Handspring, Sony and Palm Pilot. Each of these companies produce products which utilize the same computer program to operate, therefore individual preferences will determine which manufacturer's product a user chooses. While other manufacturers and operating systems are available, the Palm OS is the most widely used system today. Therefore, tree inventory tools that utilize the Palm

OS are offered here.

The primary requirement to operate the PDA inventory programs outlined here are that they be capable of running the Palm OS and have a minimum of 2MB of memory. Other functions, such as a color screen, increased memory or a cellular modem, are not needed to operate most inventory programs, but may increase personal productivity or comfort. Choosing a PDA for your needs will direct the final cost and configuration of what you ultimately purchase, and can range from \$150 to nearly \$500. The more memory that your PDA contains, the less likely you will be to overload its storage capacity, eliminating frequent downloads of data to a desktop computer. Increased memory will raise the cost, so you should closely examine costs and benefits of the additional investment.

Only five years ago, a street tree inventory was completed by community volunteers in Brookline, Mass., who used Husky Hunter 16 data recorders, which sold for over \$1,200 each. At that time the purchase or lease of the hand-held units was clearly unaffordable for many communities or commercial firms, which is dramatically different than the situation today. Outfitting a cadre of community volunteers or staff with today's current technology is fully affordable in most cases.

In the event that you are purchasing many units, it is best to buy the same type and capability, so that if a unit goes out of service it can be replaced or shared with another user. This redundancy will reduce downtime during your inventory operations and ensure that all users are fully skilled in the use of your units.

Palm-based solutions

Many Palm OS programs are available for use in PDA's, and many can be useful to the arborist, tree manger or consultant. Business applications range from datebooks and address books to mileage and travel logs. A seemingly endless palette of applications are available for purchase or free download via the Internet, enabling PDA users to become truly "digital" in their approach to data management. In the same manner that paper ledger

books were replaced by computer spreadsheets, the PDA is increasingly becoming the tool of choice for business mangers. Arborists, consultants, and tree wardens can take advantage of many PDA programs that provide specific tools for the industry, and can adapt others that are used by other professions.

Several commercial tree vendors provide PDA and other hand-held computer programs for use in the industry, including tree inventory operations. These are generally linked to desktop database applications that are used to archive and study data. These programs offer valuable data-management capabilities to municipalities, commercial tree care firms, consultants and tree managers. Data collection is usually accomplished using a PDA or other hand-held data recorder or computer. For a list of NAA members who sell computer arborist-specific software, call 1-800-733-2622.

The USDA Forest Service Northeast Center for Urban & Community Forestry, in cooperation with the University of Massachusetts/Amherst and the City of Springfield, Mass., Park Department has developed programs for public distribution, and they can be downloaded from <http://www.umass.edu/urbantree/palm/>. The applicability of these programs for tree managers is outlined here.

Pendragon Forms data collection system

One popular Palm OS software program, Pendragon Forms 3.1, is available for under \$175. It allows for easy collection and processing of tree survey data, or any other digital databases, for that matter. This software can be used to create customized database templates for tree surveys, or other data collection needs, such as work orders, without specific programming experience. This easy-to-use program allows the user to develop PDA collection templates, using the Pendragon Forms program, which can be modified, updated or revised based on particular needs. Additionally, the USDA Forest Service has created two public domain inventory database templates, available for download, that

Data collection using a personal digital assistant provides field personnel with a lightweight, inexpensive and easy-to-use tool for collecting data on trees and transferring it to a database program on a desktop computer.

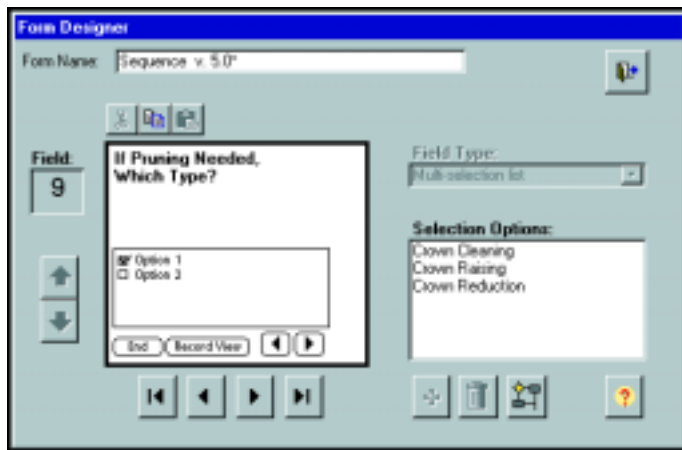


utilize Pendragon Forms software. These templates can be downloaded and used "as is" on a PDA, or modified by the user. A street tree inventory template and a hazard tree rating template are also available for download.

Pendragon Forms allows for flexibility and customizing of the data-collection process, and enables the user to develop additional electronic forms that can be used to track information related to your tree management operations. However, the templates available for free download are fully functional, and incorporate key inventory criteria, such as species, size, condition and maintenance needs. These templates demonstrate the capability of the software while providing PDA data-collection tools that can serve as the foundation for tree inventory and hazard management operations you may undertake.

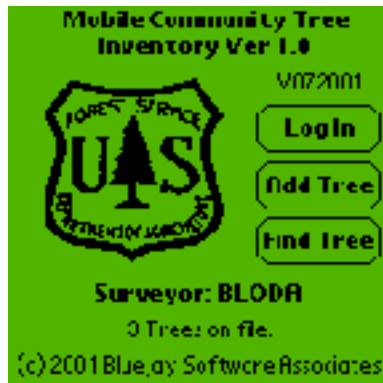
In addition to using Pendragon Forms for inventory data collection, it is very easy to build custom database input forms for collecting information on a variety of tasks, ranging from work orders to equipment maintenance. The program enables the user to recreate traditional paper forms in digital form for use on a PDA. No special programming experience is required, and can be accomplished using the Reference Guide that is supplied with the software. Sample templates are also included with the program, allowing the user to examine various capabilities of the program.

More information on the Pendragon Forms is available at <http://www.pendragonsoftware.com>. A free,



Pendragon Forms software allows the user to customize data collection forms on a personal computer, for use on a PDA. Custom input forms such as this one can be created with minimal technical expertise.

The MCTI login screen allows users to identify the community, the range tree identification numbers and inventory personnel.



The MCTI screens duplicate data entry fields that might be found on a paper-based inventory tally sheet.



14-day evaluation copy is available at the site, enabling use of the templates developed by the USDA Forest Service and its partners.

Mobile Community Tree Inventory (MCTI) System

The idea behind The Mobile Community Tree Inventory (MCTI) system was to design a tree inventory software application that could be distributed to arborists, tree managers, city foresters and consultants at no cost via the Internet. The idea also was to have it packaged as a stand-alone program, requiring the purchase of no additional computer software. MCTI was developed through a partnership of the USDA Forest Service Northeast Center for Urban & Community Forestry, the City of Springfield, Mass., and the University of Massachusetts/Amherst. Realizing that the implementation of any new data-collection system can be very challenging, the MCTI development team reviewed several existing inventory models and worked with professional arborists to develop a program that addressed the challenge of integrating a computer system into the deeply rooted human processes used in surveying trees.

The MCTI system is comprised of three components, with each building on the foundation of the previous level. A tree care firm or municipality needs to identify the level of MCTI capability they feel is appropriate and begin working with that MCTI component. Some organizations may have previous inventory experience and feel comfortable starting with the third

level of the MCTI process; others may want to start at the first step.

Level 1: A paper record

The MCTI design team recognized that a number of municipalities complete a significant amount of their tree inventory utilizing trained community volunteers. These volunteers may have little or no experience working with computers or PDA's. However, the organization does not want to lose the opportunity to collect valuable data. In this case, the use of paper inventory (or tally) sheets may be appropriate.

The paper based data collection system has certain advantages. The system is non-threatening to individuals who are uncomfortable around technology. The form is simple enough to be completed by a layperson and is it is designed so the data can be easily entered into the MCTI system at a later date. A copy of the MCTI paper inventory sheet is available for download at <http://www.umass.edu/urbantree/mcti/>.

There are a number of challenges that are associated with this method of data collection. The more opportunities the data collector has to write down information, the more opportunity there is for error. The collector may have poor handwriting or may record information in the wrong survey box. This would prevent accurate analysis, making much of the inventory data unusable. Even though paper remains the standard for storing in-

formation, paper data is very difficult to analyze quickly and accurately.

Level 2: The desktop program

The next component in the MCTI system is a computer-based software application. This software resides on a computer much the same way a word processor or e-mail application does. The software uses has an easy-to-use screen to enter the data and a database to store information. The data can be entered from the paper-based forms or by using a PDA, which will be outlined in the Level Three discussion that follows. Using the MCTI software application represents a dramatic step towards efficiency. Information is stored in a database using unique numbers to identify specific trees. Trees in the database system can be searched or modified with just a few mouse clicks, instead of searching a file cabinet. The system comes with a summary report that produces over two dozen useful statistics. Included in the report are the average number of trees per mile, the number of trees per person, and the average tree diameter at breast height. Trees can be inventoried numerous times and long-term care can be examined.

A person with a working knowledge of computers will need about 30 minutes to customize the MCTI program for their specific organization. In setting up the program for its initial use, you will need to enter information about your organization including state, community name, and species of trees likely to be found in the

survey area. This and other information will help the MCTI software complete the screen menus automatically each time you use the software.

The quality of the information stored in the database depends entirely on the quality of the information going into the database. Data coming from paper forms is more likely to have errors. Using the PDA component along with the desktop application enables the user to utilize a fully computerized system for tree inventory data collection, storage and analysis. The desktop application and the PDA software outlined below can be obtained free of charge from the USDA Forest Service's Northeast Center for Urban & Community Forestry's Web site at <http://www.umass.edu/urbantree/mcti>.

Level 3: The PDA application

The most efficient and cost effective way to collect and analyze tree inventory data is to use the complete MCTI package. The package includes the desktop software and the data collection software designed for the PDA. The PDA data-collection software is available free of charge from the Web site noted above. Your organization will need to provide a PDA with minimum memory (2MB) and a personal computer. Once the desktop and PDA software has been downloaded and configured, they are ready for use. The screens on the PDA are very intuitive, allowing the user to begin collecting data with very little instruction. The MCTI package ensures that errors are minimized and speed is maximized when collecting and reporting data. The user picks choices by tapping the PDA screen instead of the error-prone process of writing out information on paper.

The PDA software has anticipated many common inventory problems. Tree identification numbers are commonly assigned in sequential order. The software allows the user to set the starting number of the ID sequence each time they begin collecting data. This feature is especially helpful if you are using multiple teams to collect data. By assigning numeric ranges, the users can be assured that two teams will never assign the same number to different trees. The PDA software also accepts Glo-

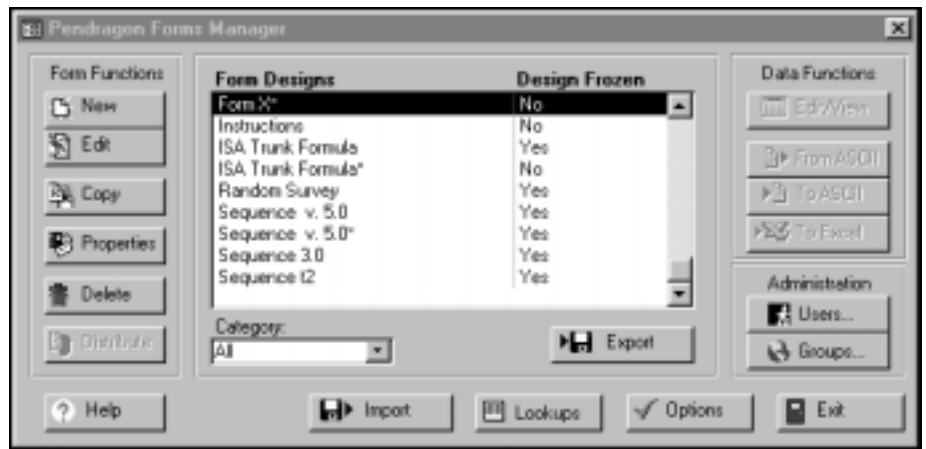
bal Positioning Systems (GPS) coordinates if you are using this type of system to record a tree's location.

Once a team has completed their inventory session, transferring data from the PDA to the database is simple and fast. The user places the unit into its docking cradle and presses the "HotSync" button. Over a thousand trees can be transferred to the desktop database application in under one-minute. The transferred information is immediately available and included in the summary reports. A complete product description and recommendations for purchasing a PDA is available in the MCTI manual.

The MCTI reference manual, PDA application and desktop software are available

Public domain Palm OS based PDA software and templates are available, at no cost, for download and use. These programs and templates provide a foundation upon which to establish an accurate, low-cost inventory program for public and private trees. Also, a rating system for potential tree hazards is available using public domain templates via free download.

Today, state-of-the-art technology is more affordable, while the simplicity and capability of the programs continues to expand. Based on the availability of these affordable solutions, isn't it about time that you put data-collection capability in the palm of your hand today?



Using Pendragon Forms, a series of data entry templates can be created on a personal computer and uploaded to a PDA for use in the field. These template designs can be custom designed and uploaded to individual PDA's.

for free download at <http://www.umass.edu/urbantree/mcti>.

Conclusion

Affordable, easy-to-use computer technology is making the work of arborists and tree managers more efficient, cost effective and accurate. PDA's, are one of the latest technical tools that help provide a low-cost, efficient method for collecting information on trees that ultimately will be included in a management database. Additionally, PDA's provide an opportunity to streamline other management and data-collection activities, and serve as an alternative to costly handheld data recorders or paper data-collection systems.

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